DANIEL M. BISHOP

S-J files
Environaid

RR 4, BOX 4993
JUNEAU, ALASKA 99803
907 789-9305

103-60-31

Sept. 27, 1980

Notes on Black Bear Lake Investigations:
Visit 9/21 - 25 '80

I. Thermograph installations: All thermographs in place. No evidence of disturbance. No instruments were opened; no changes made.

II. Lake temperature profiles: see enclosed figures.

Thermoclines in Black Bear Lake now about 55 ft.

No thermoclines in Black Lake.

III. Lake conductivity profiles; see enclosed figures. YSI S-C-T model 33 meter used. Water for measurements below 50 ft. drawn up with plastic Nansen bottle.

All conductivities remain low.

Possible changes with depth; with thermocline.

Measurements at/near bottom of Black Lake show increased conductivity, particularly when probe lies in bottom sediments.

IV. Lake dissolved O_2 profiles: YSI mod. 57. See enclosed figures.

Dissolved O_2 thru-out most of profiles remain near saturation levels.

A small depression of D.O. occurs as bottom of lake is approached.

V. Stream discharge measurements:

	August:	Sept:
a. mouth, Bl.Bear Lk. (drain area=1.9 mi^2	23.76 $ft.^3/sec$ (USGS staff=4.60)	42.45 $ft.^3/sec$ (USGS staff=4.91-4.90)
b. mouth str. entering Bl.Lk. (drain area=6.3mi^2)	34.19	72.57
c. 200 yds below outlet Bl.Lk. (drain area=)	63.01	101.44
d. mouth, Bl. Creek nr. bridge (drain area=17.3mi^2)	78.41	355.71

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V. (cont.) This Sept. set of flow measurements is about the maximum flow situation measureable by wading method.

VI. pH & other measurements:

Location	Date/Time	Air Temp.	Water Temp.	pH	Conduct.	Diss.O_2
Bl. Bear Lk at outlet	9/23 AM	10 -11°C	9.4°C	6.5	14	10.6
Bl. Bear Lk. wtr f'm -50'	9/23	-	9.1°C	6.6	21	10.9
Bl. Lk. inlet stream	9/22,1200	15.5°C	9.4°C	6.3	32	11.2
Bl. Lk. outlet stream	9/22,1300	12.3°C	10.0°C	6.3	37	10.0
Bl. Creek at mouth	9/24, 1000	13.5°C	10.0°C	6.4	96	10.6

VII. Water chemistry samples taken at -50 ft. in Black Bear Lake; mouth Black Bear Lake; Black Lake at outlet; and Black Creek at mouth.

Acidified, un-acidified samples taken. Samples returned to Lauck's Testing Lab., Seattle on 9/26/80 with instructions to analyze for total phosphorous; total (k,eldahl) nitrogen; turbidity; and color. Color was re-measured because change was notable from headwaters to mouth.

Sample results will be forwarded.

VIII. Observations of stream and lake form and character.

A walk up the headwaters of Black Lake-Creek to the base of the falls below Black Bear Lake developed information of interest.

Upon crossing the spruce windfall-filled mouth of the S.W. fork of Black Creek (about 3/4 mile below the Black Bear Lake falls) it was evident that this sizeable fan area contains numerous spring-fed gravel channels as well as braided flood channels.

Above this principal fork area in the stream, the main arm leading up to the falls continues for a quarter-mile or so thru large spruces at a general gradient aroung 1 - 2 percent with gravel riffles, suitable for spawning. It appears that the principal salmon spawning riffles above Black Lake are located in about a 3/4 mile section of the stream and the lower west fork, beginning about a quarter

mile below the stream.

Upstream from this section of gravel riffles, the streambed to the falls begins to rise in step-wise form, dominated by cobble and boulder material with less gravel present. The average grade appears to be about 5 - 10%. Many logs and trees are in the streambed.

A number of old channels are evident in the half mile or so below the falls. These channels may be associated with the evident landslide or torrent flow history of this area. It is likely that the lower portions of these old channels develop spring flows and possibly fishery habitat.

Along the westerly shores of Black Lake lie a couple of alluvial fan areas. We used the southerly fan to land with the the Beaver and to beach our inflatable skiff. This fan had numerous spring flows near the lake shoreline. But no sockeye were seen to spawn along this beach area in August or September.

IX. Observation of fish.

No adult fishes were seen above the entrance of the inflow stream into Black Lake. Many fry and fingerling salmonids were seen in the inflow stream - two size classes of small fish were seen; those about 3 inches long and those about 4-5 inches long.

Two loggers fished one morning at the outlet of Black Lake. They caught a half-dozen 10-12 lb. coho,(one quite bright, the others just beginning to turn color) and several dollies and cut-throat.

A couple of adult spawning sockeye remained below the mouth of Black Lake. This pair of spawners were joined by a half-dozen smaller salmonids believed to be jack sockeye.

Numerous jumping adult salmon were seen in Black Lake. They were undoubtedly coho. Coho adults were also amply evident at the lower mouth of Black Creek. Since no coho were seen in spawning riffles above or below Black Lake, it appears that these fish have not reached spawning ground in any number. We will probably see them spawning in Oct.

Black Creek, below Black Lake, lives up to its name in the fall, when organic leachates discolor the water. It would not be possible to visually survey this main section of Black Creek for salmon during the high Fall flows.

X. Mammals: The following notes were prepared by Asst. Leigh Smith.

9/23 Hike from upper Black Lake to base of falls below Black Bear Lake.

The following observations are recorded after a ramble through the brush above Black Lake on 9/23.

The low country bisected by Black Creek as it enters Black Lake is marked by a number of large mammal trails generally paralleling the creek, and intersected frequently by smaller ancillary trails heading cross-valley toward the higher ridge vases. Much of this intermittent trail system seems aged from a time some years B.P., and mammal use appears to be presently lower than in the past. Sparse presence of scats, bed site, tracks and hair, signs of feeding, lead me to believe that the trails were formed in a time some years ago when mammals were more populous in this area.

Bears appear to use this low country heavily for foraging, there being healthy stands of Vaccinium, Rubus Spectobilis and Lysichiton americanum which are an important food source. Areas of dense L. americanum are extensively uprooted by bears. At several sites along the creek there were fresh bear trails heading through the brush at right angles to the creek, petering out 50' distant in the brush as is common in bear country.

Marten and other sign is common.

Mink are abundant in the area below Black Lake but no definite sign was observed above the lake on 9/23. There is no reason to believe they are not present.

No definite deer sign was observed, although in the lake bed just below the creek mouth, deer tracks were noted.

No definite wolf sign was observed, although one possible old winter scat was found on a well-worn trail 300 meters below the falls.

Beaver sign is dense in the area immediately above Black Lake. Fresh cuttings, tracks, scats, and well-used runs are common. There is an extensive, freshly and well-maintained dam of some 200' in length above the creek on the S.W. side.

Generally speaking mammal use of this area appears to be at a lower point in a cycle which in the not-too-distant past was much greater. This information was garnered only by the most casual and brief observations secondary to a stream-intensive hike of some five hours duration. For any realistic assessment of mammal use in this area a great deal more ground time is required.

Dan Bishop

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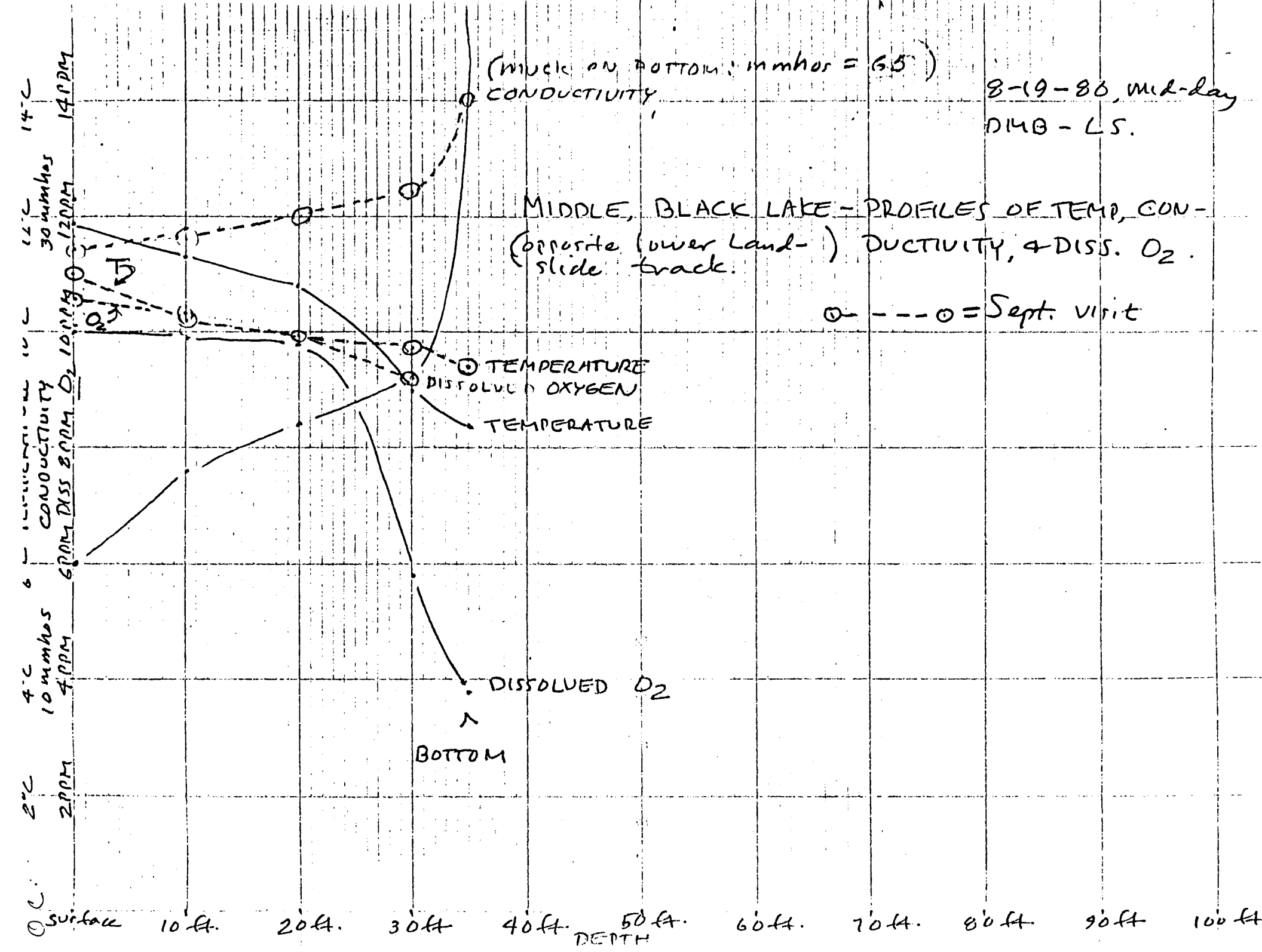
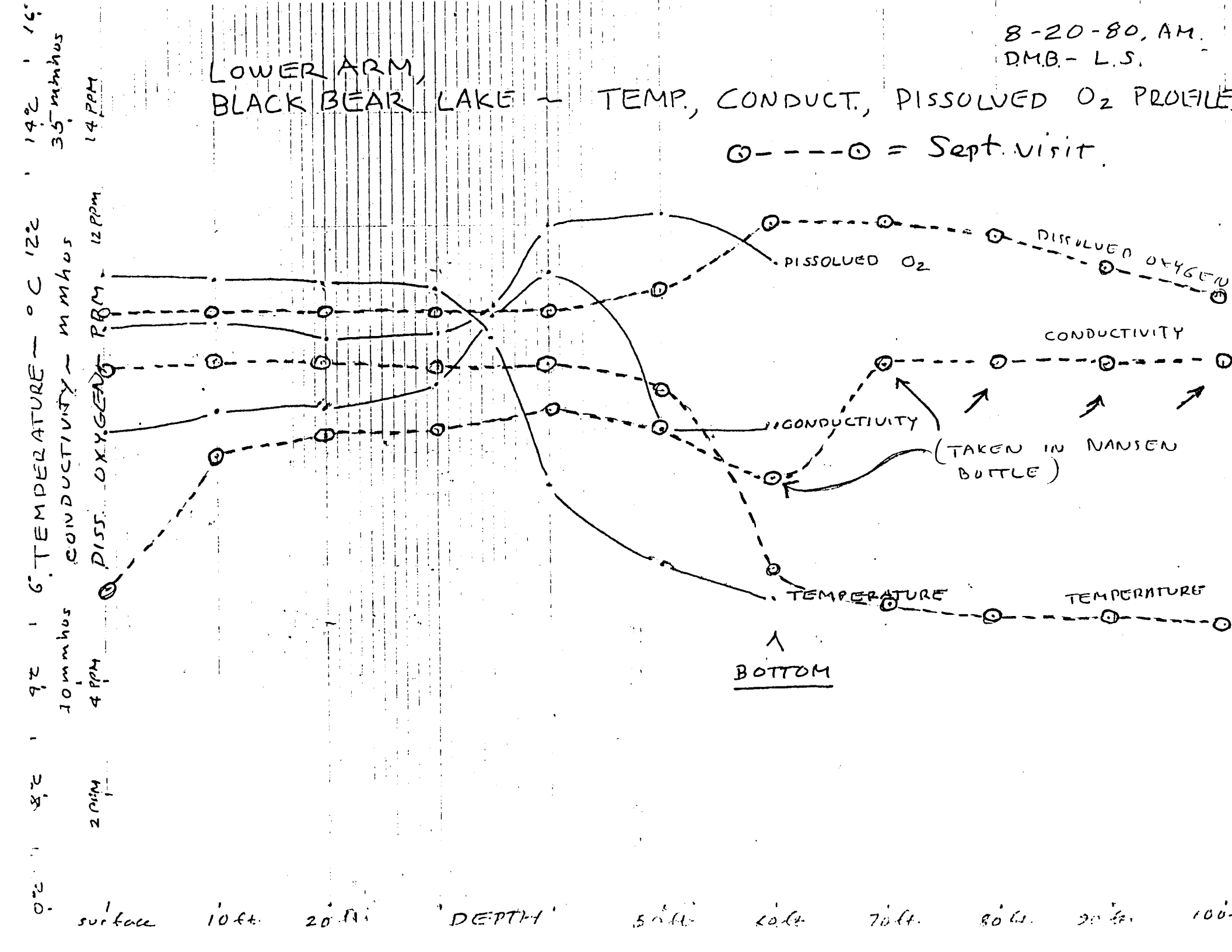
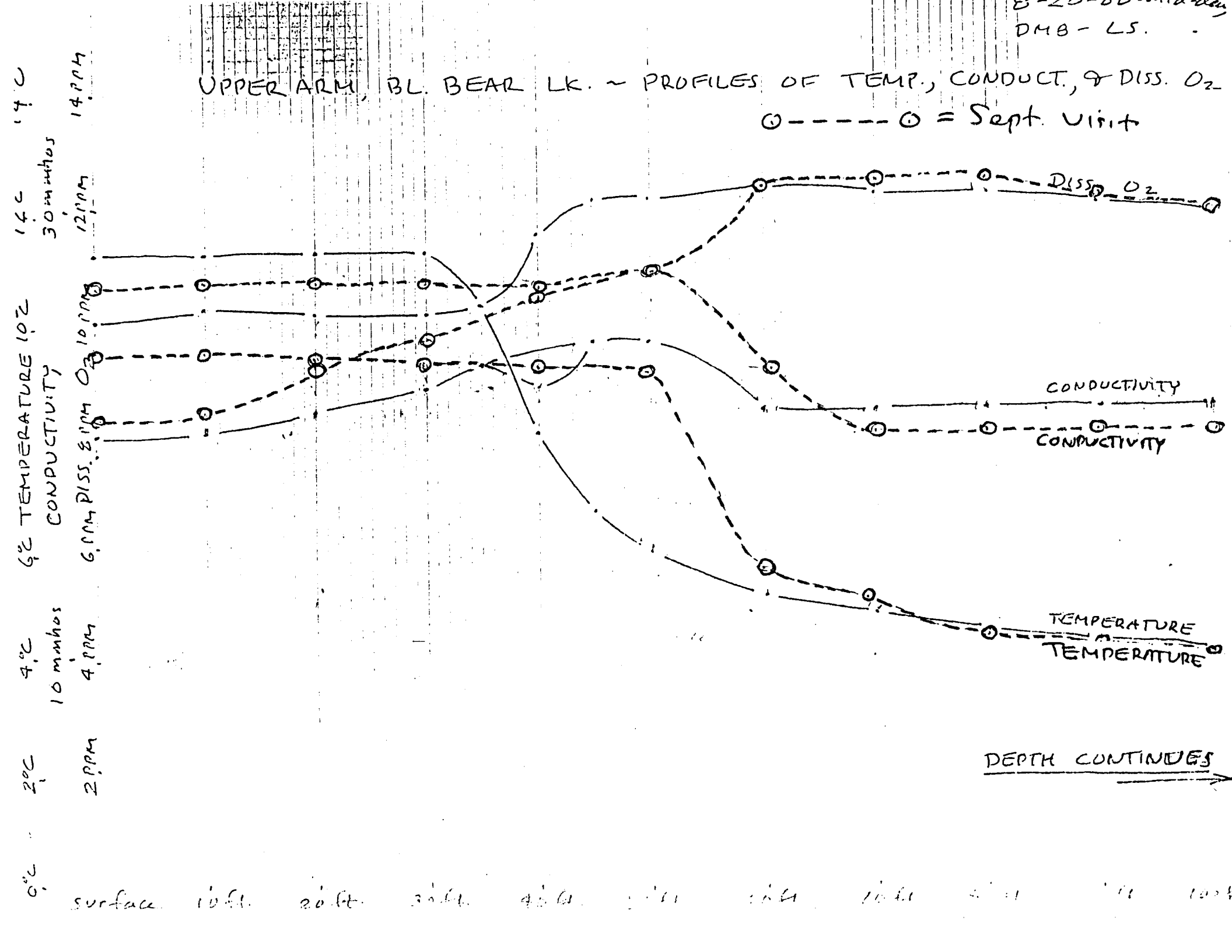

(MUCK ON BOTTOM: 1 mmhos = 6.5 ppm)
CONDUCTIVITY
8-19-80, Mid-day
DMB - LS.
MIDDLE, BLACK LAKE - PROFILES OF TEMP, CONDUCTIVITY, & DISS. O2.
(opposite lower Landslide track.)
= Sept. visit
TEMPERATURE
DISSOLVED OXYGEN
TEMPERATURE
DISSOLVED O2
BOTTOM
14°C
14 ppm
12°C
30 mmhos
12 ppm
10 ppm
6 ppm
4°C
10 mmhos
4 ppm
2°C
2 ppm
0°C
surface
10 ft.
20 ft.
30 ft.
40 ft.
50 ft.
60 ft.
70 ft.
80 ft.
90 ft.
100 ft
DEPTH


8-20-80, AM.
D.M.B. - L.S.
LOWER ARM, BLACK BEAR LAKE - TEMP., CONDUCT., DISSOLVED O2 PROFILE
O----O = Sept. visit
DISSOLVED OXYGEN
CONDUCTIVITY
TEMPERATURE
(TAKEN IN NANSEN BOTTLE)
BOTTOM
DEPTH
surface
10 ft.
20 ft.
50 ft.
60 ft.
70 ft.
80 ft.
90 ft.
100
14 PPM
12 PPM
4 PPM
2 PPM
16°C
14°C
12°C
9°C
8°C
35 mmhos
10 mmhos


DMB - LS.
UPPER ARM, BL. BEAR LK. ~ PROFILES OF TEMP., CONDUCT., & DISS. O2
O-----O = Sept. visit
14 ppm
12 ppm
10 ppm
6 ppm DISS. O2
4 ppm
2 ppm
14 C
30 micromhos
6°C TEMPERATURE 10°C
CONDUCTIVITY
4°C
10 micromhos
2°C
0°C
DISS. O2
CONDUCTIVITY
CONDUCTIVITY
TEMPERATURE
TEMPERATURE
DEPTH CONTINUES
surface 10 ft. 20 ft.